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10/647,454	08/26/2003	Makoto Kitano	Q76961	3244
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EXAMINER				
YAMNITZKY, MARIE ROSE				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/647,454

Applicant(s)

KITANO ET AL.

Examiner

Marie R. Yamnitzky

Art Unit

1794

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/5508)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

1. This Office action is in response to applicant's amendment filed September 29, 2008, which amends claim 1.

Claims 1 and 3-24 are pending.

2. The claims remain subject to an election of species. Claims 1 and 3-24 continue to read on the elected species.

The elected species was previously found to be patentable, as well as other patentable subject matter as set forth in the last paragraph on page 3 of the Office action mailed April 10, 2008. However, none of the pending claims are limited to the patentable subject matter, and the prior art suggests non-elected species within the scope of claim 1 and claims dependent therefrom as set forth below.

3. Claims 1 and 3-24 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claims contain subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 as amended contains conflicting definitions for the variables "l" and "n" of formula (2) as noted below in the rejection under 35 U.S.C. 112, second paragraph. Further, the recitation of "n and l are one or more" is not fully supported by the original disclosure, which

does not provide for polymers comprising a repeating unit of formula (2) wherein l and/or n is greater than 2.

4. Claims 1 and 3-24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The scope of a polymer compound comprising at least one repeating unit shown by formula (2) as defined in claim 1, with claims 3-24 dependent directly or indirectly therefrom, is not clear. Claim 1 as amended provides two different definitions of conflicting scope for the variables n and l of formula (2). Claim 1 first recites "l, m and n each independently represent an integer of 0 to 2" and later recites "n and l are one or more". It is not clear if l and n represent an integer of 0 to 2, or if l and n are one or more (with "or more" encompassing integers greater than 2), or if l and n each independently represent an integer of 1 or 2.

Further, if l and n are one or more (or each independently represents an integer of 1 or 2), then the phrase "l+m+n+o+p is 2 or more" is superfluous.

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1 and 3-24 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Kreuder et al. (US 5,814,244) for reasons of record as set forth in the Office action mailed April 10, 2008 with the following correction.

In the rejection as set forth in the April 10th action, the sentence reading “Kreuder et al. provide for polymers comprising a repeating unit of present formula (2) wherein n is 2 and each of l, m, n and p is 0.” should read --Kreuder et al. provide for polymers comprising a repeating unit of present formula (2) wherein n is 2 and each of l, m o and p is 0.--

This rejection is maintained subject to clarification of the issues raised in this action under 35 U.S.C. 112, 2nd paragraph.

7. Claims 1, 3-5 and 10-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lamansky et al. (US 2004/0004433 A1).

Polymers of Formula 30 as shown on page 9 of Lamansky's publication are polymer compounds comprising a repeating unit of formula (2) as defined in present claim 1 wherein n is 2, each of m, o and p is 0, l is 0 or 1, each of Ar₅, Ar₆ and Ar₇ (and Ar₈ when l is 1) is an arylene group, and each of E₈ and E₉ (and E₅ when l is 1) is an aryl group (the other Ar and E variables shown in formula (2) are not present when m, o and p are 0). Such polymers wherein l is 0 are provided by Formula 30 wherein each of R₃ and R₄ is other than -NR_aR_b where R_a and R_b are aryl. Such polymers wherein l is 1 are provided by Formula 30 wherein each of R₃ and R₄ is -NR_aR_b where R_a and R_b are aryl. See paragraph [0047] for example. The only limitation of a polymer compound according to present claim 1 that is not expressly taught by Lamansky et al.

with respect to Lamansky's Formula 30 is the polystyrene reduced number average-molecular weight. It would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable and optimum number-average molecular weights for the polymers. Lamansky provides a specific example of a polymer of Formula 32 having a polystyrene reduced number average-molecular weight (M_n) of 1.49×10^3 (see paragraphs [0130]-[0132]). Polymers of Formula 32 are disclosed for the same use as polymers of Formula 30. One of ordinary skill in the art at the time of the invention would have reasonably expected that polymers of Formula 30 having a similar M_n to that of the polymer of Formula 32 would be suitable for use in Lamansky's invention.

Present claims 3, 4 and 10 further define aryl group (A). Aryl group (A) is a component of the repeating unit of formula (1). While further defining aryl group (A), claims 3, 4 and 10 are not limited to a polymer comprising a repeating unit of formula (1). Lamansky et al. suggest polymers within the scope of claims 3, 4 and 10 wherein the polymer is a polymer of claim 1 comprising a repeating unit of formula (2).

With respect to present claim 5, Lamansky's polymers of Formula 30 suggest polymers within the scope of claim 5 wherein each of Ar_5 and Ar_7 (and Ar_8 when l is 1) is a group of formula (2P) wherein each of Ra, Rb, Rc and Rd represents a hydrogen atom, and q is 1, and Ar_6 is a group of formula (2P) wherein each of Ra, Rb, Rc and Rd represents a hydrogen atom, and q is 2 (the other Ar variables not being present when each of m, o and p is 0).

With respect to present claim 11, Lamansky's polymers of Formula 30 suggest polymers within the scope of claim 11 wherein the polymer further comprises a repeating unit of formula

(4), (6) or (7) wherein Ar₁₂ represents an arylene group, X₂ represents -N(R₄)- and R₄ represents an aryl group.

The only limitation of a polymer compound according to present claims 5 and 11 that is not expressly taught with respect to Lamansky's Formula 30 is the number average-molecular weight limitation set forth in claim 1, which has been addressed above.

The polymers of Formula 30 are taught for use in a buffer layer of an organic electroluminescent device. The buffer layer also comprises an electron acceptor material as taught, for example, in paragraph [0067], and may also comprise a luminescent color converting material as taught, for example, in paragraph [0071]. The electron acceptor material meets the limitations of an electron transporting material per present claim 12. A luminescent color converting material meets the limitations of a light-emitting material per present claim 12.

With respect to present claims 13 and 14, Lamansky's teaching such as in paragraphs [0073]-[0077] suggest that polymers of Formula 30 may be used in an ink composition. The viscosity limitation of claim 14 is not expressly taught, but it would have been within the level of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation, to determine suitable and optimum viscosities for solutions to be used for device fabrication. For example, one of ordinary skill in the art knows that it is easier to form thinner coatings/films with a less viscous solution.

With respect to present claims 15-17, Lamansky's buffer layer comprising a polymer of Formula 30 is a conductive film and an organic-semiconductor thin film. The layer is also a

luminescent thin film when a luminescent color converting material is included per teachings as in paragraph [0071].

With respect to present claims 18-24, see paragraphs [0001]-[0002] and [0025]-[0026] for example. Further with respect to claims 19 and 20, the buffer layer will also be a light emitting layer when a luminescent color converting material is included per teachings as in paragraph [0071].

8. Claims 1, 3-10 and 12-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Towns et al. (US 2001/0037012 A1).

See the entire published application. In particular, see paragraphs [0013]-[0016], [0026]-[0031], [0050] and [0066]-[0070].

A homopolymer having repeating units of formula (15) as shown in paragraph [0028] has the same structure as a polymer compound comprising a repeating unit represented by formula (2) as defined in present claim 1 wherein n is 2, each of l, m, o and p is 0, each of Ar₅-Ar₇ is an arylene group, and each of E₈ and E₉ is a heterocyclic group (B) having three hetero atoms and having two aryl groups as substituents. Towns et al. do not expressly teach a number average-molecular weight for the polymers as required by present claim 1. It would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable and optimum number-average molecular weights for the prior art polymers. Given Towns' teachings such as in paragraph [0050], it is the examiner's position that one of ordinary skill in the art at

the time of the invention would have been lead to polymers having number-average molecular weights within the presently recited range.

Present claims 3, 4 and 10 further define aryl group (A). Aryl group (A) is a possibility for the E variables in the repeating unit of formula (1). While further defining aryl group (A), claims 3, 4 and 10 are not limited to a polymer comprising a repeating unit of formula (1). Towns et al. suggest polymers within the scope of claims 3, 4 and 10 wherein the polymer is a polymer of claim 1 comprising a repeating unit of formula (2).

With respect to present claim 5, a homopolymer having repeating units of Town's formula (15) has the same structure as a polymer compound comprising a repeating unit represented by present formula (2) wherein each of Ar₅ and Ar₇ is a group of formula (2P) wherein each of Ra, Rb, Rc and Rd represents a hydrogen atom, and q is 1, and Ar₆ is a group of formula (2P) wherein each of Ra, Rb, Rc and Rd represents a hydrogen atom, and q is 2 (the other Ar variables not being present when each of l, m, o and p is 0).

With respect to present claims 6-9, a homopolymer having repeating units of Town's formula (15) has the same structure as a polymer compound comprising a repeating unit represented by present formula (2) wherein each of E₈ and E₉ is a heterocyclic group (B') as defined in claim 6 (the other E variables not being present when each of l, m, o and p is 0). While claims 7-9 further define aryl group (A'), claims 7-9 are not limited to a polymer comprising a repeating unit of formula (2) wherein the E variables are aryl group (A').

With respect to claims 12-24, see paragraphs [0066]-[0070] in particular.

Further with respect to present claim 14, Town et al. do not disclose the viscosity of a composition comprising the polymer. It would have been within the level of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation, to determine suitable and optimum viscosities for compositions to be used for device fabrication. For example, one of ordinary skill in the art knows that it is easier to form thinner coatings/films with a less viscous solution.

Further with respect to present claims 21-24, it was known in the art at the time of the invention to incorporate EL devices into displays. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to incorporate an EL device according to Towns et al. in types of displays in which EL devices were known to be useful at the time of the invention.

9. Claims 1, 3-5, 10, 13-18 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu et al. (WO 98/06773).

Wu's poly(arylamine) of Formula (I) as shown on page 2 wherein each x is 0 has the same structure as a polymer compound comprising a repeating unit represented by formula (2) as defined in present claim 1 wherein n is 1 or 2, each of l and m is 1, each of o and p is 0, each of Ar₅-Ar₉ is an arylene group, and each of E₈ and E₉ is an aryl group. While each of the specific examples of polymers disclosed by Wu et al. is a poly(arylamine) of Formula (I) wherein each x is 1, the polymers in which each x is 0 would have been *prima facie* obvious to one of ordinary skill in the art, and would result from homopolymerization of the monomer of formula (III) as

shown on page 5. Wu et al. do not expressly teach a number average-molecular weight for the polymers as required by present claim 1. It would have been within the level of ordinary skill of a worker in the art at the time of the invention to determine suitable and optimum number-average molecular weights for the prior art polymers. Given Wu's teachings such as at page 4, lines 20-32, it is the examiner's position that one of ordinary skill in the art at the time of the invention would have been led to polymers having number-average molecular weights within the presently recited range.

Present claims 3, 4 and 10 further define aryl group (A). Aryl group (A) is a component of the repeating unit of formula (1). While further defining aryl group (A), claims 3, 4 and 10 are not limited to a polymer comprising a repeating unit of formula (1). Wu et al. suggest polymers within the scope of claims 3, 4 and 10 wherein the polymer is a polymer of claim 1 comprising a repeating unit of formula (2).

With respect to present claim 5, Wu et al. teach on page 5 that a preferred monomer is a dihalogenated N,N,N',N'-tetraaryl-1,4-phenylenediamine. A homopolymer made from a dihalogenated N,N,N',N'-tetraaryl-1,4-phenylenediamine of Wu's formula (III) provides a polymer having the same structure as a polymeric compound comprising a repeating unit represented by present formula (2) wherein each of Ar₅ and Ar₇₋₉ is a group of formula (2P) wherein each of Ra, Rb, Rc and Rd represents a hydrogen atom, and q is 1, and Ar₆ is a group of formula (2P) wherein each of Ra, Rb, Rc and Rd represents a hydrogen atom, and q is 2 (the other Ar variables not being present when each of o and p is 0).

With respect to present claims 13-18 and 21-24, see for example, page 1, lines 2-4, p. 2, l. 8-13, p. 4, l. 11-17, and p. 10, l. 23-p. 11, l. 21.

Further with respect to present claim 14, Wu et al. do not disclose the viscosity of a solution comprising the polymer. It would have been within the level of ordinary skill of a worker in the art at the time of the invention, as a matter of routine experimentation, to determine suitable and optimum viscosities for solutions to be used for device fabrication. For example, one of ordinary skill in the art knows that it is easier to form thinner coatings/films with a less viscous solution.

Further with respect to present claims 21-24, it was known in the art at the time of the invention to incorporate EL devices into displays. It would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to incorporate an EL device according to Wu et al. in types of displays in which EL devices were known to be useful at the time of the invention.

10. Applicant's arguments filed September 29, 2008 have been fully considered but they are not persuasive.

With respect to the rejection based on Kreuder et al., if claim 1 is amended to clearly limit the variable "l" to an integer of 1 or 2, the rejection will be overcome. However, given the lack of clarity with respect to the definitions of "l" and "n" in claim 1 as amended September 29, 2008, the rejection is maintained.

With respect to the rejection based on Lamansky et al., the examiner has modified the rejection to address embodiments within the scope of the present claims wherein the variable "l" represents an integer of 0 or 1. The rejection as set forth in the April 10th action only discussed the Lamansky reference in relation to claimed embodiments wherein l is 0, but given Lamansky's teaching of -NR_aR_b where R_a and R_b are aryl for each of R₃ and R₄, this reference also suggests embodiments within the scope of the present claims wherein l is 1.

With respect to the rejection based on Towns et al. (US 2001/0037012 A1), the rejection as applied to polymers comprising a repeating unit of formula (1) is overcome by claim amendment, but the rejection remains applicable to polymers comprising a repeating unit of formula (2) given the lack of clarity with respect to the definitions of "l" and "n" in claim 1 as amended September 29, 2008.

With respect to the rejection based on Wu et al., the rejection has been restated in this action to correct errors in the rejection as previously stated. In setting forth the rejection in the previous Office action, the examiner inadvertently reversed references to "x is 1" and "x is 0" (i.e. where the rejection previously recited "x is 1", the rejection now recites --x is 0--, and vice versa). In the arguments filed September 29, 2008, applicant notes the distinction between the presently claimed polymer comprising a repeating unit of formula (2) and polymers according to Wu et al. wherein x is 1 (which the examiner previously indicated as meeting the present claims). Applicant's arguments do not directly address the issue of polymers resulting from the homopolymerization of the monomer of formula (III) as shown on page 5 of the prior art, but such a polymer had incorrectly been identified as providing a poly(arylamine) of Wu's Formula

(I) wherein x is 1. (The examiner also notes that had the specific examples of polymers disclosed by Wu et al. actually been poly(arylamine)s of Formula (I) wherein x is 0, as incorrectly stated in the prior rejection, the rejection would be one of anticipation rather than obviousness.)

11. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

/Marie R. Yamnitzky/
Primary Examiner, Art Unit 1794

MRY
December 31, 2008